

## CLAIMS

### What Is Claimed Is:

- 1           1.       A device for measuring temperature, the device comprising:  
2           a housing;  
3           a temperature-responsive element supported relative to the housing, the element  
4 operable to sense temperature and move in response to temperature changes;  
5           a first inductive assembly component fixed relative to the housing; and  
6           a second inductive assembly component operatively and movably positioned  
7 relative to the first inductive assembly component, the second inductive assembly  
8 component being driven by movement of the temperature-responsive element, the  
9 movement of the second inductive assembly component relative to the first inductive  
10 assembly component generating a change in a local eddy current pattern corresponding to  
11 the sensed temperature.
- 1           2.       The device of claim 1, wherein a current at a particular point in a sensing  
2 circuit is proportional to the temperature changes causing the temperature-responsive  
3 element to move.
- 1           3.       The device of claim 1, further comprising a circuit board comprising the  
2 first inductive assembly component.
- 1           4.       The device of claim 3, wherein the circuit board comprises a processor  
2 responsive to generated eddy current patterns to generate a signal representative of sensed  
3 temperature.

1           5.       The device of claim 4, wherein the processor determines the movement of  
2 the temperature-responsive element based on the generated eddy current patterns and  
3 associates the movement with a temperature to generate the signal.

1           6.       The device of claim 1, wherein the temperature-responsive element  
2 comprises a first portion generally fixed relative to the housing and a second portion  
3 displaceable relative to the first portion, wherein the second portion drives the second  
4 inductive assembly component.

1           7.       The device of claim 6, further comprising a visual indicator movably  
2 positioned relative to the housing and driven by the second portion of the temperature-  
3 responsive element to indicate temperature.

1           8.       The device of claim 1, wherein the second inductive assembly component  
2 comprises a gear with a pitch ratio larger than that of the temperature-responsive element.

1           9.       The device of claim 8, wherein the gear comprises a protuberance that  
2 operates as an inductive target in the inductive assembly.

1           10.      The device of claim 8, wherein the pitch ratio of the gear is approximately  
2 fifteen times larger than that of the temperature responsive element.

1           11.    A device for measuring temperature, the device comprising:  
2                   a coil operable to displace in response to changes in temperature of a  
3 medium for which a temperature is to be sensed;  
4                   a rotatable shaft driven by the temperature-responsive coil;  
5                   an inductive target displaceable by the rotatable shaft; and  
6                   an inductor positioned relative to the inductive target such that  
7 displacement of the inductive target by the rotatable shaft generates a change in a local  
8 eddy current pattern corresponding to the temperature to be sensed.

1           12.    The device of claim 11, wherein the inductive target is rotatable with the  
2 rotatable shaft.

1           13.    The device of claim 12, further comprising a circuit board comprising an  
2 opening through which the rotatable shaft extends, wherein the circuit board comprises  
3 the inductor.

1           14.    The device of claim 13, wherein the inductive target rotates in a plane  
2 generally parallel to the circuit board.

1           15.    The device of claim 13, further comprising:  
2 a pointer coupled to the rotatable shaft; and  
3 an indicia plate fixed relative to the pointer such that the pointer rotates in a plane  
4 generally parallel to the indicia plate to indicate temperature.

1           16.    The device of claim 15, wherein the inductive target is positioned between  
2 the indicia plate and the circuit board.

1           17.    The device of claim 11, wherein the coil is a bimetallic coil comprising a  
2 proximal end driving the rotatable shaft.

1           18.    The device of claim 11, wherein the inductive target comprises a plurality  
2 of radial features extending transversely relative to a longitudinal axis of the rotatable  
3 shaft.

1           19.    The device of claim 11, further comprising a microprocessor responsive to  
2 generated eddy current patterns to generate a signal representative of sensed temperature.

1           20.    The device of claim 19, wherein the microprocessor determines the  
2 movement of the shaft based on generated eddy current patterns and associates the  
3 movement with a temperature to generate the signal.

1           21.    The device of claim 11, wherein the inductive target comprises a gear with  
2 a pitch ratio larger than that of the rotatable shaft.

1           22.    The device of claim 21, wherein the gear comprises a protuberance that  
2 operates as the inductive target.

1           23.    The device of claim 21, wherein the pitch ratio of the gear is  
2 approximately fifteen times larger than that of the rotatable shaft.

1           24.    A method performed at a temperature measurement device, the method  
2 comprising:  
3           sensing a temperature change;  
4           converting the sensed temperature change to mechanical movement;  
5           converting the mechanical movement to an electrical signal representing the  
6 movement by induction;  
7           detecting the electrical signal; and  
8           determining the mechanical movement based on the electrical signal.

1           25.    The method of claim 24, wherein converting the sensed temperature  
2 change to mechanical movement comprises rotating a shaft in response to the sensed  
3 temperature change.

1           26.    The method of claim 24, wherein converting the mechanical movement to  
2 an electrical signal representing the movement by induction comprises moving an  
3 inductive target relative to an inductor, the movement generating a change in an eddy  
4 current pattern.

1           27.    The method of claim 26, wherein moving an inductive target comprises  
2 driving the inductive target with a gear that has a pitch ratio less than that of the inductive  
3 target.

1           28.    The method of claim 24, further comprising determining a temperature  
2 associated with the mechanical movement.

1           29.    The method of claim 28, further comprising generating a signal  
2 representing the temperature.

1           30.    The method of claim 28, wherein determining a temperature associated  
2   with the mechanical movement comprises determining the amount of mechanical  
3   movement.

1           31.    A device for measuring temperature, the device comprising:  
2               means for sensing a temperature change;  
3               means for converting the sensed temperature change to mechanical movement;  
4               means for converting the mechanical movement to an electrical signal  
5   representing the movement by induction;  
6               means for detecting the electrical signal; and  
7               means for determining the mechanical movement based on the electrical signal.

1           32.    The device of claim 31, wherein converting the sensed temperature change  
2   to mechanical movement comprises rotating a shaft in response to the sensed temperature  
3   change.

1           33.    The device of claim 31, wherein converting the mechanical movement to  
2   an electrical signal representing the movement by induction comprises moving an  
3   inductive target relative to an inductor, the movement generating a change in an eddy  
4   current pattern.

1           34.    The device of claim 33, wherein the inductive target has a pitch ratio  
2   substantially smaller than a driving means.

1           35.    The device of claim 31, wherein the determining means is further operable  
2   to determine a temperature associated with the mechanical movement.

1           36.    The device of claim 35, wherein determining a temperature associated  
2   with the mechanical movement comprises determining the amount of mechanical  
3   movement.

1           37.    The device of claim 31, wherein the determining means is further operable  
2    to generate a signal representing the temperature.



1           38.     A device for measuring temperature, the device comprising:  
2           a transducer comprising:  
3                 a temperature-responsive, bimetallic coil positioned to displace in  
4     response to changes in temperature of a medium for which a temperature is to be sensed,  
5     and  
6                 a rotatable shaft coupled to a second end of the coil, the shaft rotatably  
7     driven by the coil;  
8           an inductive target coupled to the shaft and rotated thereby, the target comprising  
9     a plurality of radial features extending transversely relative to a longitudinal axis of the  
10    rotatable shaft;  
11          a circuit board comprising an opening through which the rotatable shaft extends,  
12    the circuit board further comprising:  
13                 an inductor positioned relative to the inductive target such that rotation of  
14    the inductive target by the shaft generates a change in a local eddy current pattern  
15    representing the shaft rotation, and  
16                 a microprocessor responsive to generated eddy current patterns to  
17    determine the rotation of the shaft, to associate the rotation with a temperature, and to  
18    generate an electrical signal representative of sensed temperature; and  
19          a visual indicator comprising:  
20                 an indicia plate generally parallel to the circuit board, and  
21                 a pointer fixed to the rotatable shaft relative to the indicia plate to indicate  
22    temperature, wherein the inductive target is positioned between the indicia plate and the  
23    circuit board and the pointer rotates in a plane generally parallel to the indicia plate.